



Mandatory Provident Fund Schemes Authority
強制性公積金計劃管理局

**A 10-year Investment Performance Review of
the MPF System
(1 December 2000 - 31 December 2010)**

**強積金制度十年投資表現回顧
(2000年12月1日至2010年12月31日)**

March 2011
2011年3月

© Mandatory Provident Fund Schemes Authority 2011

Reproduction for non-commercial purpose is permitted provided that the source is properly stated.

Published by

Mandatory Provident Fund Schemes Authority

Level 16, International Commerce Centre

1 Austin Road West, Kowloon

Hong Kong

Tel : 2918 0102

Fax : 2259 8806

Email : mpfa@mpfa.org.hk

Website : www.mpfa.org.hk

© 版權所有 強制性公積金計劃管理局 2011

歡迎各界引用或複製本報告內容，惟須清楚註明資料來源，且不得作商業用途。

出版機構：

強制性公積金計劃管理局

香港九龍柯士甸道西 1 號

環球貿易廣場 16 樓

電話 : 2918 0102

傳真 : 2259 8806

電郵 : mpfa@mpfa.org.hk

網址 : www.mpfa.org.hk

**A 10-year Investment Performance Review of
the MPF System
(1 December 2000 – 31 December 2010)**

Acknowledgement

The methodology and analysis of this report have been reviewed by Prof Kalok Chan, Synergis-Geoffrey Yeh Professor of Finance and Head of Department of Finance, The Hong Kong University of Science and Technology. The Mandatory Provident Fund Schemes Authority would like to thank Prof Kalok Chan for his advice and assistance in preparation of the report.

This report is compiled by the Policy Development and Research Department of the Mandatory Provident Fund Schemes Authority for general reference only. The findings, interpretations and conclusions expressed in this report are general in nature and do not take into account the personal circumstances of any person. While every effort has been made to ensure accuracy, the Authority shall not be liable for any errors or omissions in or any reliance placed upon this report. Past performance is not necessarily indicative of future performance. Individuals are advised to obtain independent advice before making decisions in relation to their MPF investments.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
CHAPTER 1 INTRODUCTION	1
Objectives	1
Scope	1
Methodology	3
Data Sources	5
CHAPTER 2 PERFORMANCE OF THE MPF SYSTEM AS A WHOLE	6
CHAPTER 3 PERFORMANCE OF DIFFERENT TYPES OF MPF FUNDS.....	9
CHAPTER 4 RELATIONSHIP BETWEEN RISK AND RETURN	15
CHAPTER 5 IMPLICATIONS	18
Appendix A Features and Categorization of Different Types of MPF Funds.....	23
Appendix B Methodology – Calculation of Return	26
Appendix C Methodology – Risk Measurement	29

EXECUTIVE SUMMARY

1. This report is prepared to review the investment performance of the Mandatory Provident Fund (“MPF”) System for the period from the commencement of the MPF System on 1 December 2000 to 31 December 2010 (the “review”).¹ The review aims to provide scheme members (“members”) and other stakeholders with a better understanding of the investment performance of the MPF System and different types of MPF funds over a 10-year period. All figures on return or performance in this report are **net of (i.e. after deducting) fees and charges**.

KEY FINDINGS

Performance of the MPF System as a Whole

2. From 1 December 2000 to 31 December 2010, a total net amount of HK\$277.52 billion was contributed to the MPF System. As of 31 December 2010, those total net contributions had grown to HK\$365.44 billion of accrued benefits. This means that investment returns had added HK\$87.92 billion to the net contributions of members.
3. As a whole, the MPF System recorded an annualized return of 5.5% over the 10-year period after fees and charges.² The yearly performance of the MPF system, as driven by corresponding changes in underlying investment markets, fluctuated during the review period, ranging from a negative annualized return of -25.9% to a positive annualized return of 30.1%.
4. It should however be noted that the return figures are System-wide figures. Individual members’ MPF accounts will have displayed returns in excess of or lower than the MPF System as a whole, depending primarily on their choice of fund and the timing of their contributions.

Performance of Different Types of MPF Funds

5. A total of 479 MPF constituent funds (“MPF funds”), which had operated in the MPF System at any point in time during the 10-year period, were included in the review. Funds have been categorized under one of six types, namely, equity funds, mixed assets funds, bond funds, guaranteed funds, MPF conservative funds and money market funds & others.

¹ Specifically, the review covers a period of 10 years and one month.

² The return of the MPF System was calculated by way of the internal rate of return (“IRR”), a method commonly known as dollar-weighted return. The IRR method takes into account the amount and timing of contributions into and benefit withdrawals from the MPF System. For details on calculation methodology, please refer to Appendix B.

6. All six types of funds added value to contributions over the 10-year period. As a group, equity funds, mixed assets funds and bond funds were the top performers, producing annualized returns of 5.7%, 4.9% and 3.9% respectively for the 10-year period. At the other end of the spectrum were guaranteed funds, MPF conservative funds and money market funds & others which generated annualized returns of 1.6%, 1.2% and 0.8% respectively.³
7. For equity funds, consistent with underlying equity markets, the performance varied considerably depending on the geographical allocation of assets. Of all equity funds, the best performing sub-category was Asia equity funds, followed by Hong Kong equity funds, Global equity funds, Europe equity funds and North America equity funds.
8. Within mixed assets funds, the fund performance varied depending substantially on the percentage of equity content. For bond funds, Global bond funds outperformed Hong Kong bond funds.
9. MPF conservative funds achieved returns lower than other fund types as would be expected given the types of underlying assets. Returns of MPF conservative funds were however higher than the Hong Kong dollar savings rate⁴ and the growth of the Consumer Price Index over the review period.

Relationship between Risk and Return

10. The risk level of MPF funds was examined by measuring the standard deviation of monthly returns. Measured on this basis, of the six types of MPF funds, equity funds had the highest level of risk, followed by mixed assets funds, bond funds, guaranteed funds, money market funds & others and MPF conservative funds.
11. The review also examined the risk level by measuring the range of monthly returns (“range”) generated over a period of time. On this basis, equity funds again had the highest level of risk, while MPF conservative funds had the lowest. The results were similar to those based on the analysis of standard deviation.

³ In view of the absence of available data on contributions into and benefit withdrawals from MPF funds, the returns of different types of MPF funds were calculated by way of the time-weighted method instead of the dollar-weighted method. The time-weighted method takes into account the unit price of each MPF fund and its asset size relative to the aggregate asset size of all MPF funds of the same fund type at different points in time. For details on calculation methodology, please refer to Appendix B.

⁴ Hong Kong dollar savings rate is measured by the Prescribed Savings Rate for MPF conservative fund. Prescribed Savings Rate for MPF conservative fund is the rate at which interest is payable by the three note-issuing banks in Hong Kong in respect of a Hong Kong dollar savings account with deposit amount of HK\$120,000. Where different banks may pay interest on Hong Kong dollar savings accounts at different rates, the Prescribed Savings Rate for MPF conservative fund is the simple average of the interest rates offered for deposit amount of HK\$120,000 by these banks.

IMPLICATIONS

Positive Overall Returns Generated for MPF Members

12. The review suggests that the MPF System has generally added value to members' contributions since its launch. Despite the fluctuations of the global economy and financial markets, the MPF System boosted the accrued benefits of its members by an annualized return of 5.5% each year over the 10-year period.

Strong Relationship between Risk and Return

13. The review suggests that MPF funds had generally exhibited the expected relationship between risk and return, namely, the higher the potential return in the long run, the higher the risk.

Saving Outcome Hinges on Members' Investment Decision

14. Under the MPF System, all members can choose between MPF funds in the scheme in which they are enrolled. The review indicates that fund choice made by members will have an important impact on their saving outcomes, and accordingly, the overall return of the MPF System. For instance, over the 10-year period, the cumulative return of equity funds amounted to 75.4%, while that of the MPF conservative funds was 12.6% only. Expressed in another way, equity funds returned, on average, almost six times as much as MPF conservative funds over the review period. These return figures however have to be understood in the context of associated risk levels. Equity funds had the highest level of risk with range of monthly returns as wide as 36.02% in the 10-year period, while MPF conservative funds had a range as narrow as 0.53%.

MPF Returns Should be Considered over the Long Term

15. The results of the review suggest that members should take a long-term view when looking at their MPF investments and, depending on the timing of their need to access accrued benefits, they should not be overly concerned with short-term return fluctuations. Despite the repercussions of significant financial market volatility during the review period, including the global financial crisis in late 2008 to early 2009, the MPF System was able to weather the storm and add value to members' contributions over the 10-year period.

16. The return of MPF investment is characterized by the compounding effect in which reinvesting earnings (e.g. dividends, interest and/or capital gains) over time can lead to potentially larger increases in value. Therefore, members can expect that the power of the compounding effect will be more pronounced as the investment horizon gets longer.

Diversification Tends to Lower Risk

17. The review findings also suggest that diversification across regions or asset classes tends to lower overall investment risk.

Looking at Past Performance with Care

18. Members are reminded that the return figures set out in this report are only intended to give a generalized indication of the progress of the MPF System and the relationship between risk and return. The fund-type figures set out in the report should not be seen as providing any firm indicator for predicting future absolute performance of MPF funds. They may however be indicative of reasonable expectations about the relative risk and return attributes of different fund types.
19. Members should not make fund choice decisions solely based on short- or even medium-term historical performance. Other relevant factors such as fees and charges, quality of services, and suitability of the individual MPF funds for their own circumstances need to be considered.

CHAPTER 1 INTRODUCTION

Objectives

1. The Mandatory Provident Fund (“MPF”) System has been in operation for slightly over 10 years. This report is prepared to review the investment performance of the MPF System for the period from the commencement of the MPF System on 1 December 2000 to 31 December 2010 (the “review”). The objectives of the review are to:
 - (a) provide MPF scheme members (“members”) and other stakeholders with a better understanding of the investment performance of the MPF System as a whole and of the different types of MPF constituent funds (“MPF funds”) for the period from 1 December 2000 to 31 December 2010; and
 - (b) help members understand the implications of the investment performance review and how that might assist them in managing their MPF investments.

Scope

2. The review examines the investment returns (“returns” or “performance”) of the MPF System and of the different types of MPF funds over a 10-year period, from 1 December 2000 to 31 December 2010 (“10-year period” or “review period”). Specifically, the review covers a period of 10 years and one month. All figures on return or performance in this report are **net of (i.e. after deducting) fees and charges**.
3. Every MPF fund that had operated in the MPF System at any point in time during the 10-year period was included in the analysis. A total of 479 MPF funds were included in the review, of which 385 were existing funds as of 31 December 2010 (“existing MPF funds”) and 94 were terminated before 31 December 2010 (Table 1).

Table 1 Number of MPF Funds Covered in the Review by Fund Type

Fund Type	Number of MPF Funds Covered in the Review		% of Total Number of MPF Funds ⁱⁱⁱ	
	Number of Existing MPF Funds as of 31 Dec 2010 ⁱ	Number of MPF Funds Terminated before 31 Dec 2010 ⁱⁱ		
Mixed Assets Fund	164	41	205	42.8%
Equity Fund	121	13	134	28.0%
MPF Conservative Fund	39	17	56	11.7%
Guaranteed Fund	28	13	41	8.6%
Bond Fund	29	4	33	6.9%
Money Market Fund & Others ^{iv}	4	6	10	2.1%
Total	385	94	479	100%

Source: MPFA

i 36 newly approved MPF funds which did not have fund prices at the time of analysis were excluded.

ii Returns of the terminated funds were calculated up to the last month with fund price.

iii Figures do not sum up to the total due to rounding.

iv Covers money market funds that are not MPF conservative funds and uncategorized funds as per the Performance Presentation Standards for MPF Investment Funds.

4. Table 2 shows the net asset values of MPF funds by fund type over the review period.

Table 2 Net Asset Values of MPF Funds by Fund Type

(HK\$ million)

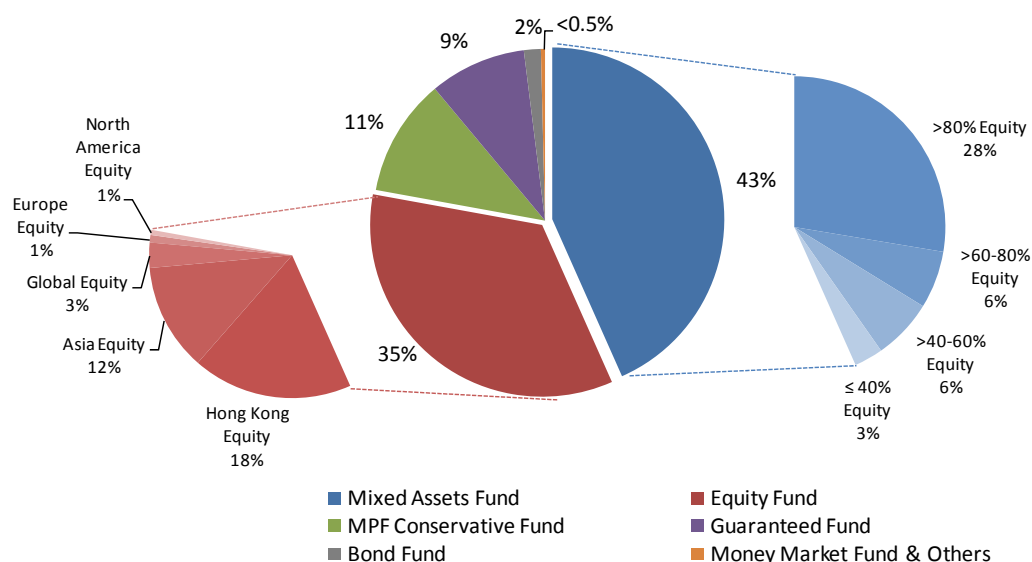
As of	Fund Type						Total*
	Mixed Assets Fund	Equity Fund	MPF Conservative Fund	Guaranteed Fund	Bond Fund	Money Market Fund & Others	
31.12.2001	16,599	6,098	5,329	7,312	219	456	36,013
31.12.2002	26,665	6,982	9,404	10,988	425	600	55,063
31.12.2003	45,173	13,360	14,150	14,937	1,051	740	89,409
31.12.2004	61,526	19,550	18,237	18,528	1,486	856	120,183
31.12.2005	78,020	27,214	21,960	21,302	1,846	1,018	151,360
31.12.2006	105,244	43,500	25,908	24,246	2,427	1,082	202,407
31.12.2007	131,785	74,772	28,260	25,755	3,093	1,121	264,786
31.12.2008	95,312	49,880	33,306	25,926	3,855	1,205	209,484
31.12.2009	137,344	95,408	39,100	30,683	4,958	1,378	308,870
31.12.2010	158,407	126,121	40,501	33,185	5,843	1,385	365,442

* Figures may not sum up to the total due to rounding.

Source: MPFA

5. Chart 1 sets out the percentage share of net asset values of MPF funds by fund type as of 31 December 2010.

Chart 1 Percentage Share of Net Asset Values of MPF Funds by Fund Type as of 31 December 2010



Source: MPFA

Methodology

6. Broadly speaking, the following methodology was employed in conducting the review:

(a) Categorization of MPF Funds

- (i) For those parts of the review that consider performance by fund type, MPF funds were classified into six types, namely, equity funds, mixed assets funds, bond funds, guaranteed funds, MPF conservative funds and money market funds & others.
- (ii) The categorization was mainly based on the fund type as specified in the Fund Descriptor of the latest Fund Fact Sheet of the relevant scheme.
- (iii) For further analysis, equity funds, mixed assets funds and bond funds are classified into sub-types.
- (iv) Appendix A sets out the general features of the six types of MPF funds and the detailed categorization methodology.

(b) Calculation of Returns

Based on the availability of data, different methods were used for calculating the returns of the MPF System and of different types of MPF funds. The results generated by these different methods might differ to some extent.

(i) Return of the MPF System

The return of the MPF System was calculated by way of the internal rate of return (“IRR”), a method commonly known as “dollar-weighted return”. The IRR method takes into account the amount and timing of contributions into and benefit withdrawals from the MPF System. We consider this the preferred methodology as it could better reflect the feature of cash inflow and outflow of the MPF System.

(ii) Return of Different Types of MPF Funds

- In view of the absence of available data on contributions into and benefit withdrawals from MPF funds by type, returns of different types of MPF funds cannot be calculated by the IRR method. Instead, they were calculated by way of the time-weighted method, which takes into account the unit price and asset size of each MPF fund at different points in time. Unlike the IRR method, it does not capture the impact of the contributions into and benefit withdrawals from MPF funds.
- In the review, cumulative return refers to the total return of a specific fund type for the entire 10-year period, and annualized return represents the average return of a specific fund type generated each year over the 10-year period.

(iii) It should be noted that all return figures are net figures, i.e. after fees and charges of operating the MPF schemes. Also, the return figure of a specific type of MPF funds represents the weighted-average return of all MPF funds within that specific type and not the performance of any individual MPF fund.

(iv) Appendix B sets out the detailed methodology and adjustments made in calculating the returns of the MPF System and of different types of MPF funds.

(c) Risk Measurements

- (i) Two different measures of risk have been adopted in this review. Standard deviation of monthly returns (“standard deviation”) (i.e. a measure of fluctuation of monthly returns over time) and range of monthly returns (“range”) (i.e. the difference between the highest and lowest monthly return figures) are used as the measurements of risk of different types of MPF funds.
- (ii) Appendix C sets out the detailed methodology used in calculating standard deviation and range.

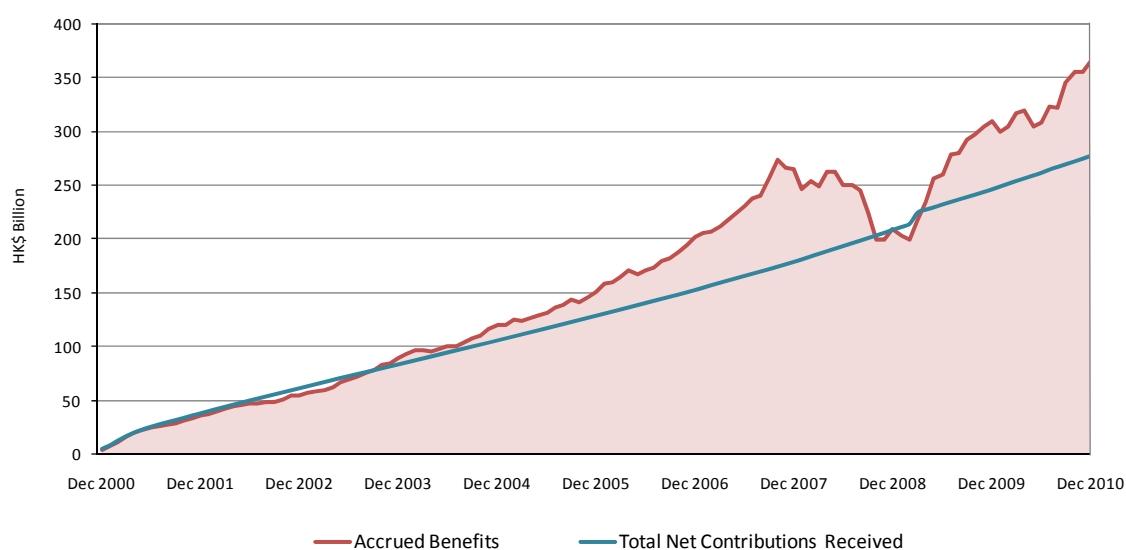
Data Sources

- 7. All MPF data used in the report were obtained from MPF approved trustees.

CHAPTER 2 PERFORMANCE OF THE MPF SYSTEM AS A WHOLE

- From the inception of the MPF System to 31 December 2010, a total net amount of HK\$277.52 billion was contributed to the MPF System.¹ As of 31 December 2010, the total net contributions had grown to HK\$365.44 billion of accrued benefits.² This means that investment returns had added HK\$87.92 billion to the net contributions of members. Chart 2 shows the trend of accrued benefits over the 10-year period.

Chart 2 Accrued Benefits and Total Net Contributions Received Since the Inception of the MPF System



Source: MPFA

- As a whole, the MPF System recorded an annualized return of 5.5% over the review period after fees and charges.³ The yearly performance of relevant markets fluctuated considerably during the review period, resulting in MPF System returns that varied ranging from a negative annualized return of -25.9% to a positive annualized return of 30.1% (Table 3).

¹ The amount included mandatory and voluntary contributions of employers, self-employed persons and employees, money transferred from occupational retirement schemes, and special contributions paid by the Government in the period of March 2009 – December 2010, net of withdrawals from the MPF System during the 10-year period.

² “Accrued benefits” means the amount of scheme members’ beneficial interests in the registered schemes, including contributions together with the income or profits arising from any investments thereof but taking into account any losses in respect thereof.

³ All system-wide returns presented in this report are annualized dollar-weighted returns.

Table 3 Annualized Internal Rate of Returnⁱ of the MPF System since Inception

Period	(HK\$ million)				Annualized Internal Rate of Return ⁱⁱⁱ
	Net Asset Values		Total Net Contributions during the Period ⁱⁱ	Net Investment Return ⁱⁱⁱ during the Period	
	Period-Beginning (a)	Period-End (b)			
1.12.2000 – 31.3.2002	-	42,125	43,878	- 1,753	-4.9%
1.4.2002 – 31.3.2003	42,125	59,305	23,016	- 5,837	-10.7%
1.4.2003 – 31.3.2004	59,305	97,041	22,133	15,604	22.0%
1.4.2004 – 31.3.2005	97,041	124,316	22,205	5,070	4.7%
1.4.2005 – 31.3.2006	124,316	164,613	23,435	16,862	12.3%
1.4.2006 – 31.3.2007	164,613	211,199	24,684	21,901	12.4%
1.4.2007 – 31.3.2008	211,199	248,247	26,844	10,205	4.5%
1.4.2008 – 31.3.2009	248,247	217,741	38,503 ^{iv}	- 69,010	-25.9%
1.4.2009 – 31.3.2010	217,741	317,310	29,484 ^{iv}	70,086	30.1%
1.4.2010 – 31.12.2010 ^v	317,310	365,442	23,341 ^{iv}	24,790	7.5% ^v
Since Inception of the MPF System					
1.12.2000 – 31.12.2010	-	365,442	277,523^{iv}	87,919	5.5%

- i The return of the MPF System was calculated by way of the internal rate of return (“IRR”), a method commonly known as dollar-weighted return. The IRR method, which takes into account the amount and timing of contributions into and benefits withdrawn from the MPF System, was used as it could better reflect the feature of cash inflow and outflow of the MPF System. The annualized IRR was calculated by raising the monthly IRR to the power of 12. For details on the calculation method of the annualized IRR, please refer to Appendix B.
- ii The amount included mandatory and voluntary contributions of employers, self-employed persons and employees, money transferred from occupational retirement schemes, and special contributions paid by the Government in the period of March 2009 – December 2010, net of withdrawals from the MPF System during the 10-year period.
- iii Return figures are **net of fees and charges**.
- iv Includes \$8.41 billion of special contributions paid by the Government in the period of March 2009 – December 2010.
- v As the period covered is less than one year, the figure reflects the IRR for the relevant period.

Source: MPFA

3. Since assets of MPF funds are invested in financial instruments, the performance of the MPF System hinges on the financial market conditions in the respective markets in Hong Kong and abroad. The choice of funds by scheme members also directly impacts on System return. It should be noted that the MPF System has significant exposure to conservative assets, like cash and deposits, partly through members’ investments in MPF conservative funds, money market funds & others, and guaranteed funds. In terms of asset allocation, cash and deposits accounted for 11%-26% of the aggregate net asset values of MPF funds during the review period.

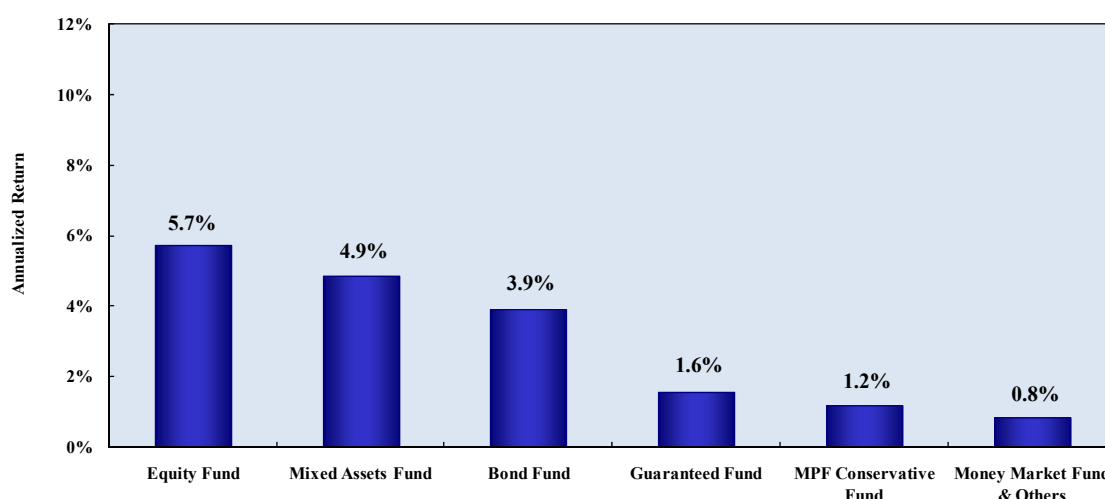
4. On the back of the sluggish world-wide economic conditions and the bearish stock markets in the initial two years of its inception, the MPF System recorded annualized returns of -4.9% from 1 December 2000 to 31 March 2002 and -10.7% from 1 April 2002 to 31 March 2003.
5. With a subsequent economic recovery and a significant upsurge in stock markets, the MPF System had a remarkable year in 2003/04, registering an annualized return of 22.0% for the year. The return of the MPF System receded at 4.7% in 2004/05, but rebounded again to 12.3% in 2005/06.
6. Higher return of the MPF System was maintained in 2006/07 at an annualized rate of 12.4%. In 2007/08, the return of the MPF System receded at 4.5%. Owing to the repercussions of the global financial crisis in late 2008 and early 2009, the annualized return of the MPF System was -25.9% in 2008/09. Thanks to a recovery from the global financial crisis, the MPF System recorded a return of 30.1% in 2009/10. From 1 April 2010 to 31 December 2010, the return amounted to 7.5%.
7. Over the whole review period, the MPF System generated an annualized return of 5.5%. It should however be noted that the return figures are System-wide figures. Individual members' MPF accounts will have displayed returns in excess of or lower than the MPF System as a whole, depending primarily on their choice of fund and the timing of their contributions.

CHAPTER 3 PERFORMANCE OF DIFFERENT TYPES OF MPF FUNDS

Overview

1. MPF funds have been categorized under one of six types, namely, equity funds, mixed assets funds, bond funds, guaranteed funds, MPF conservative funds and money market funds & others. Over the 10-year period, all of these six fund types added value to MPF contributions, ranging from 5.7% annualized return for equity funds to 0.8% annualized return for money market funds & others⁴ (Chart 3). All figures on return or performance are **net of fees and charges**.
2. As a group, equity funds, mixed assets funds and bond funds produced much higher returns than guaranteed funds, MPF conservative funds and money market funds & others over the 10-year period. Equity funds, mixed assets funds and bond funds recorded annualized returns of 5.7%, 4.9% and 3.9% respectively for the 10-year period, while guaranteed funds, MPF conservative funds and money market funds & others produced annualized returns of 1.6%, 1.2% and 0.8% respectively (Chart 3).

Chart 3 Annualized Return of MPF Funds for the 10-year Period by Fund Type

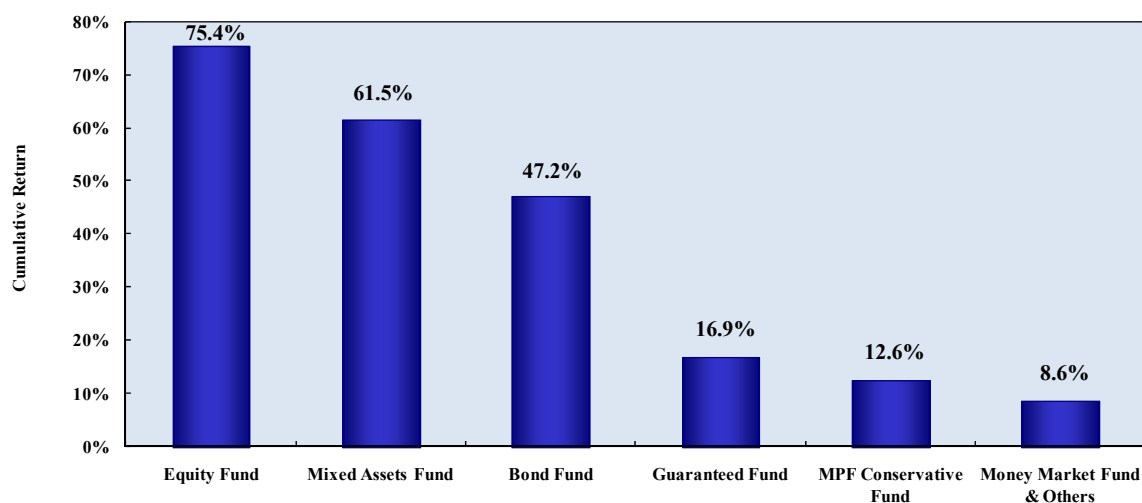


Source: MPFA

⁴ In view of the absence of available data on contributions into and benefit withdrawals from MPF funds, the returns of different types of MPF funds were calculated by way of the time-weighted method instead of the dollar-weighted method. The time-weighted method takes into account the unit price of each MPF fund and its asset size relative to the aggregate asset size of all MPF funds of the same fund type at different points in time. For details on calculation methodology, please refer to Appendix B.

3. Chart 4 shows the cumulative return for all types of MPF funds over the 10-year period.

Chart 4 Cumulative Return of MPF Funds for the 10-year Period by Fund Type



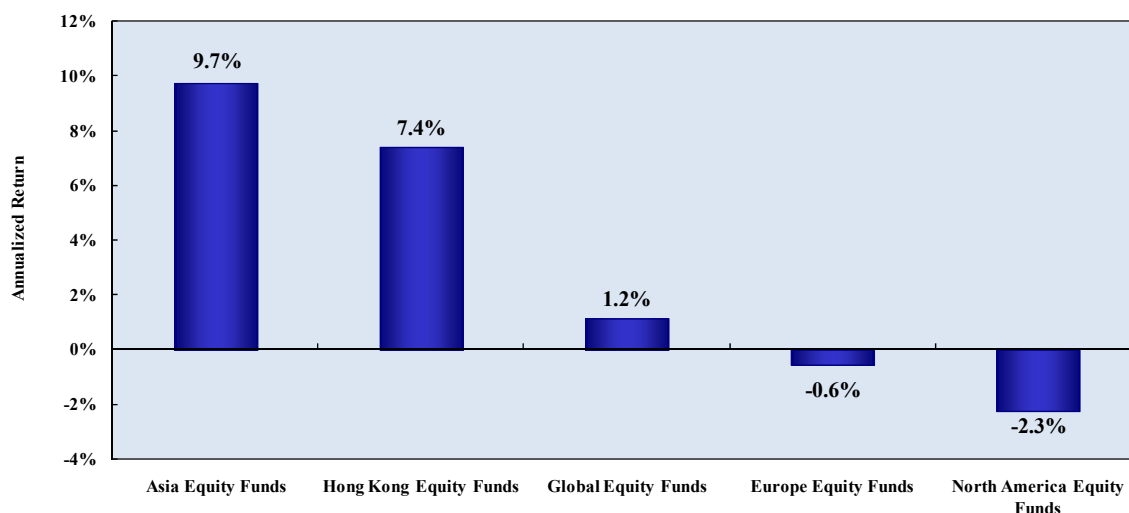
Source: MPFA

Further Analysis on the Performance of Different Types of MPF Funds

4. Further analysis was conducted in respect of equity funds, mixed assets funds, bond funds and MPF conservative funds to determine, among others, if performances varied with geographical allocation of assets in the case of equity funds and bond funds and with the percentage of equity content in the case of mixed assets funds.

Equity Funds

5. Equity funds were the best performer among all fund types. Over the 10-year period, equity funds reported an annualized return of 5.7%. In cumulative term, a return of 75.4% was generated.
6. Among equity funds, the performance varied considerably depending on the geographical allocation of assets. Of all equity funds, the best performing sub-category was Asia equity funds, producing 9.7% annualized return which were followed by Hong Kong equity funds (7.4%). Global equity funds, Europe equity funds and North America equity funds trailed behind Asia equity funds and Hong Kong equity funds by wide margins, with annualized returns of 1.2%, -0.6% and -2.3% respectively. Europe equity funds and North America equity funds were the only two sub-types of MPF funds with overall negative returns over the 10-year period (Chart 5).

Chart 5 Annualized Return of Equity Funds for the 10-year Period by Region

Note: Asia equity funds included funds investing in Asia (also including Australia and New Zealand) except those investing solely in Hong Kong equities.

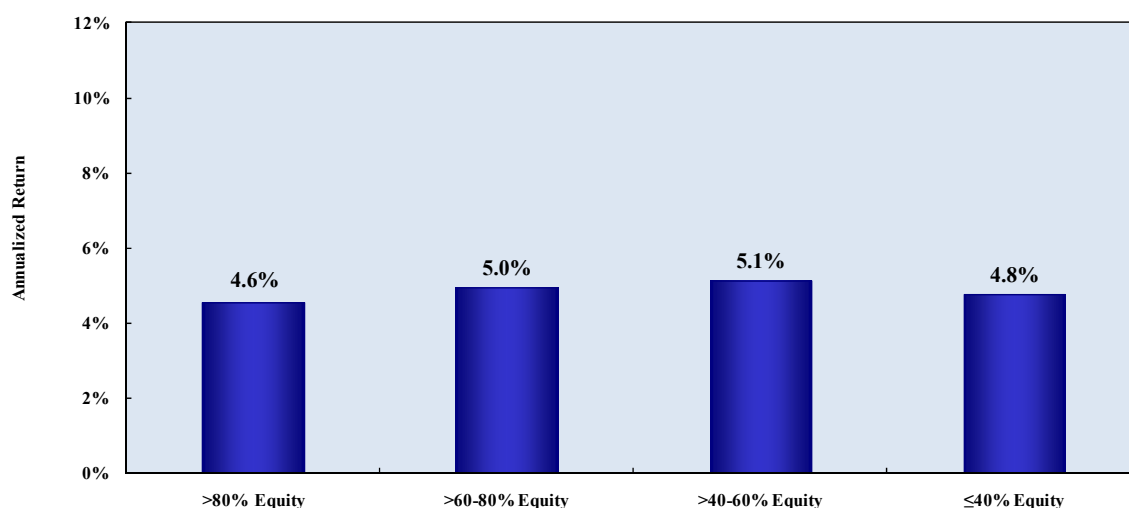
Source: MPFA

Mixed Assets Funds

7. With an annualized return of 4.9%, mixed assets funds took the second place in terms of performance among the six types of MPF funds and were only behind equity funds over the 10-year period.

8. Mixed assets funds are further categorized into the following four sub-fund types according to the percentage of equity contents: mixed assets funds ($\leq 40\%$ equity), mixed assets funds ($>40\%$ - 60% equity), mixed assets funds ($>60\%$ - 80% equity) and mixed assets funds ($>80\%$ equity). With an annualized return of 5.1%, mixed assets funds ($>40\%$ - 60% equity) were the best performer among the four sub-fund types. Mixed assets funds ($>60\%$ - 80% equity) and mixed assets funds ($\leq 40\%$ equity) were the next two in line, registering annualized returns of 5.0% and 4.8% respectively. With an annualized return of 4.6%, mixed assets funds ($>80\%$ equity) recorded the lowest return among the four sub-fund types (Chart 6).

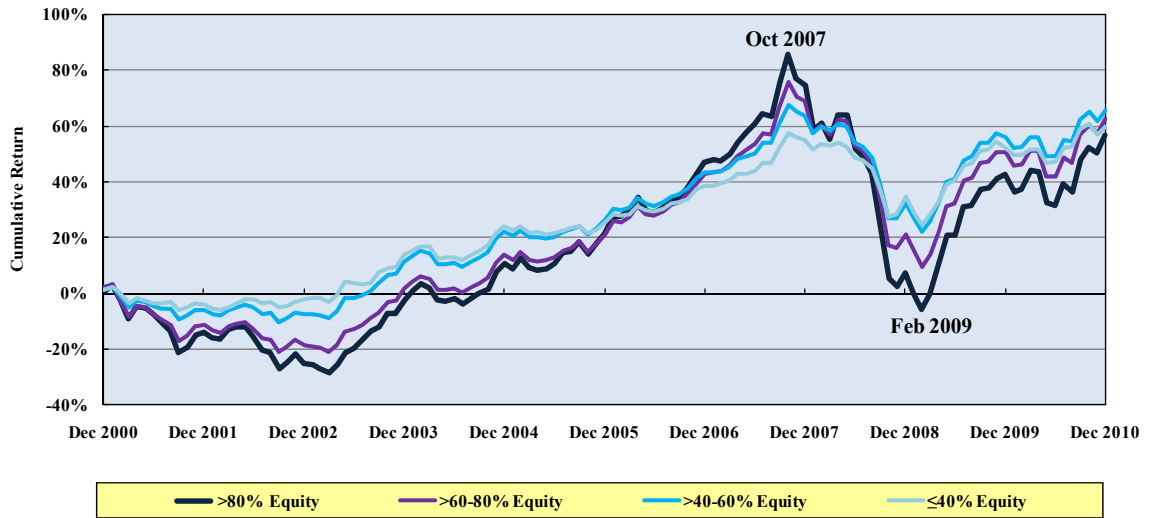
Chart 6 Annualized Return of Mixed Assets Funds for the 10-year Period by Percentage of Equity Content



Source: MPFA

9. Since mixed assets funds generally invest in equity and bond markets, the return of mixed assets funds hinges on the performance of both equity and bond markets, as well as the proportion of the assets that the fund has allocated to both markets.
10. The unique characteristic of mixed assets funds could be shown in Chart 7. When the equity market was bullish (e.g. around October 2007), the mixed assets funds with higher equity content outperformed those with less equity content. At that time, the higher the equity content of the mixed assets funds, the higher the return. When the conditions of the equity markets deteriorated (e.g. late 2008 and early 2009), the performances of these four sub-types of mixed assets funds were reversed. At that time, the higher the equity content of the mixed assets funds, the lower the return.
11. With a recovery of equity markets, the pendulum tended to swing back to the mixed assets funds with higher equity content. From end February 2009 to end December 2010, mixed assets funds (>80% equity) recorded the highest growth in cumulative return (an increase of 62.5 percentage points from -5.9% to 56.6%), followed by mixed assets funds (>60-80% equity) (an increase of 53.4 percentage points from 9.5% to 62.9%), mixed assets funds (>40-60% equity) (an increase of 43.8 percentage points from 22.0% to 65.8%), and mixed assets funds (≤40% equity) (an increase of 35.5 percentage points from 24.5% to 60.0%).
12. As such, when choosing mixed assets funds, attention has to be paid to the equity content of the fund as equity content will have a predominant impact on risks and returns compared to other mixed asset funds. The relationships between risk and return are discussed in greater details in Chapter 4.

Chart 7 Cumulative Return of Mixed Assets Funds for the 10-year Period by Percentage of Equity Content

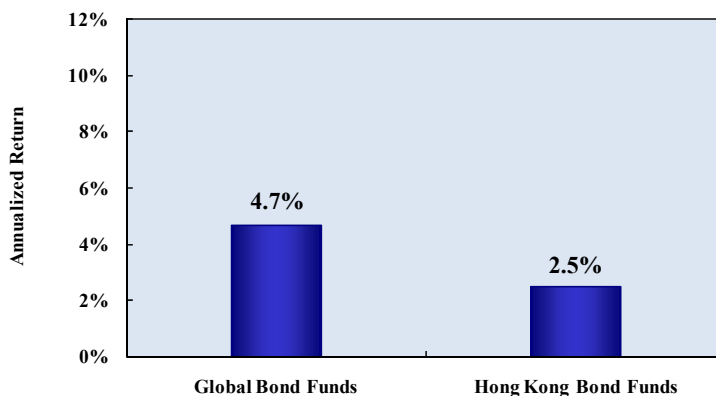


Source: MPFA

Bond Funds

- With an annualized return of 3.9%, bond funds were the third performer of all fund types over the review period. With a return of 4.7%, Global bond funds outperformed Hong Kong bond funds (2.5%) by a margin of 2.2 percentage points (Chart 8). The relative lower performance of Hong Kong bond funds may be, in part, related to the relatively small and illiquid Hong Kong bond market, compared with major overseas bond markets.

Chart 8 Annualized Return of Bond Funds for the 10-year Period by Region



Source: MPFA

MPF Conservative Funds

14. MPF conservative funds were designed as a conservative investment that would broadly earn a rate of return similar to Hong Kong dollar savings deposits with a note-issuing bank in Hong Kong. As such, assets of MPF conservative funds are generally invested in short-term bank deposits with some exposure to bonds. Over the 10-year period, MPF conservative funds recorded an annualized return of 1.2%. As a reference, the annualized return of MPF conservative funds was higher than the growth rate of the Composite Consumer Price Index (0.7% per year), and also higher than the annualized Hong Kong dollar savings rate as represented by the Prescribed Savings Rate for MPF conservative fund⁵ (0.8% per year) and one-month Hong Kong dollar deposit rate (on deposit less than HK\$100,000) (1.0% per year) over the 10-year period (Table 4).

Table 4 Annualized Return/Change of Related Indicators
(1 December 2000 – 31 December 2010)

Indicators	Annualized Return/Change
Composite Consumer Price Index % Change	0.7%
Prescribed Savings Rate for MPF Conservative Fund	0.8%
1-Month HK Dollar Deposit Rate	1.0%

Source: Census and Statistics Department, MPFA and Hong Kong Monetary Authority

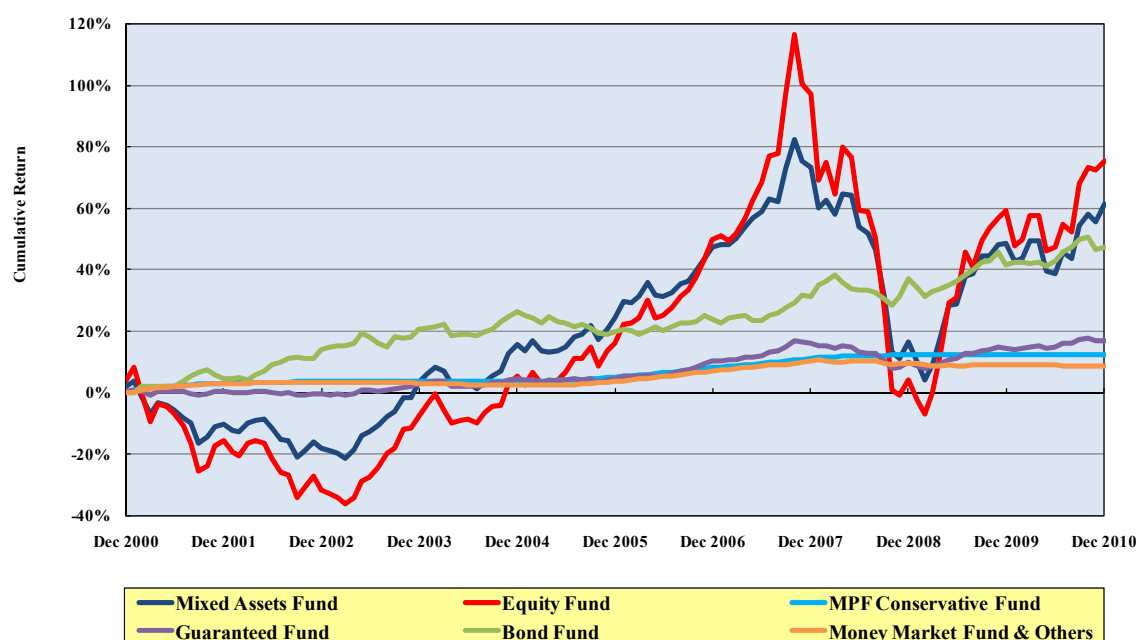
⁵ Prescribed Savings Rate for MPF conservative fund is the rate at which interest is payable by the three note-issuing banks in Hong Kong in respect of a Hong Kong dollar savings account with deposit amount of HK\$120,000. Where different banks may pay interest on Hong Kong dollar savings accounts at different rates, the Prescribed Savings Rate for MPF conservative fund is the simple average of the interest rates offered for deposit amount of HK\$120,000 by these banks.

CHAPTER 4 RELATIONSHIP BETWEEN RISK AND RETURN

Risk Measurements

1. Chart 9 shows the cumulative return of different fund types over the review period. The chart demonstrates that growth funds (e.g. equity funds and mixed assets funds) experienced much more dramatic fluctuation in returns than conservative funds (e.g. MPF conservative funds). Therefore, return figures need to be considered in conjunction with the level of risk taken in achieving those returns.

Chart 9 Cumulative Return of MPF Funds for the 10-year Period by Fund Type



Source: MPFA

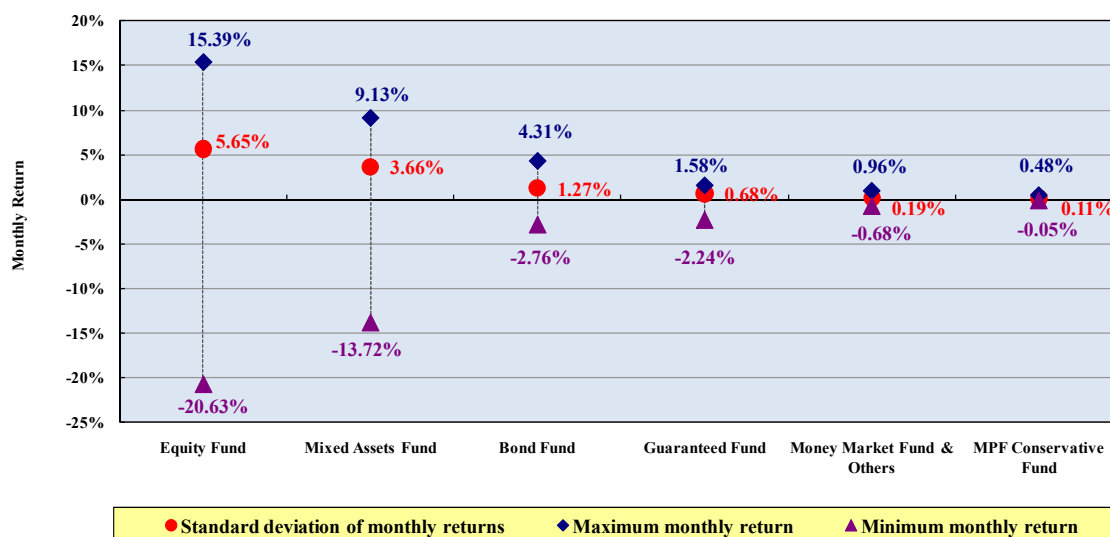
2. Risk can be understood and expressed in a number of different ways. One way of expressing risk that has been adopted in the review is in terms of volatility, as measured by standard deviation of monthly returns. Generally speaking, the higher the standard deviation, the higher the volatility, which can be considered as a higher level of risk.
3. Applied in the current context, standard deviation measures the variation of the monthly returns of a specific type of MPF funds from the weighted average return of all MPF funds within that specific fund type over the 10-year period.

- An alternative way of expressing risk that has been considered in the review is by measuring the range of monthly returns generated over a period of time. Applied in the current context, a fund type with wider range, that is with returns rising and falling substantially over a certain period, denotes a higher level of risk. On the other hand, a fund type with narrower range denotes a lower level of risk.

Risk Levels of Different Fund Types

- Looking at the risk level from the perspective of standard deviation, among the six types of MPF funds, equity funds indicated the highest level of risk, followed by mixed assets funds, bond funds, guaranteed funds, money market funds & others, and MPF conservative funds (Chart 10).
- Looking at the risk level from the perspective of range, the results were similar to those based on the analysis of standard deviation. Again, equity funds had the highest level of risk with a range as wide as 36.02 percentage points (monthly returns ranging from -20.63% to 15.39%) within the 10-year period, while MPF conservative funds had a narrow range of 0.53 percentage point (monthly returns ranging from -0.05% to 0.48%).

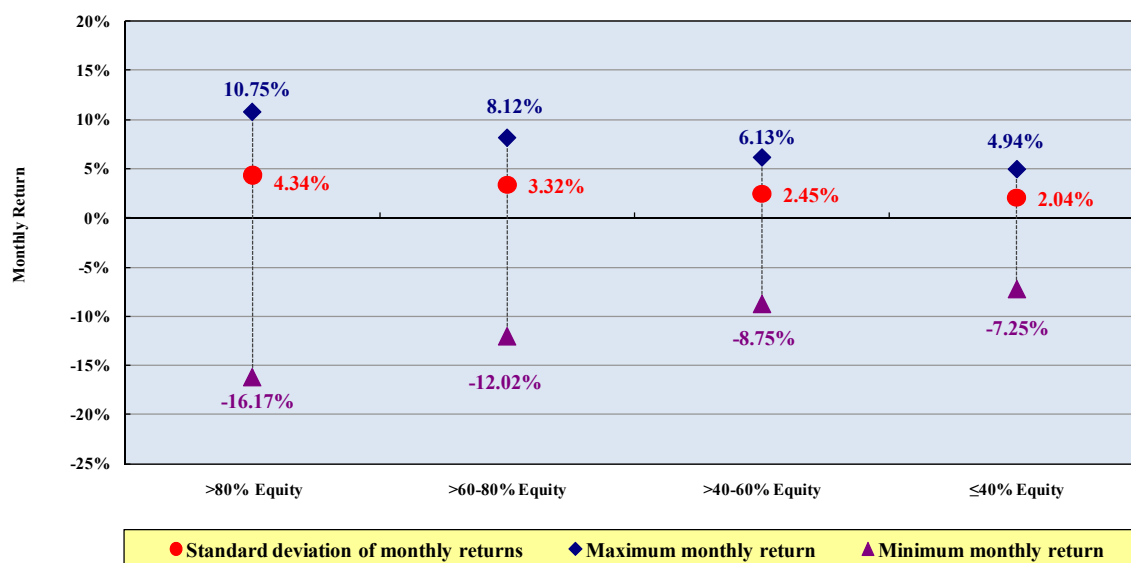
Chart 10 Standard Deviation, Maximum and Minimum Monthly Returns of MPF Funds for the 10-year Period by Fund Type



Source: MPFA

- Mixed assets funds with higher equity content tended to have greater risk (4.34% standard deviation for mixed assets funds (>80% equity)) compared to those with lesser equity content (2.04% standard deviation for mixed assets funds (\leq 40% equity)) (Chart 11).

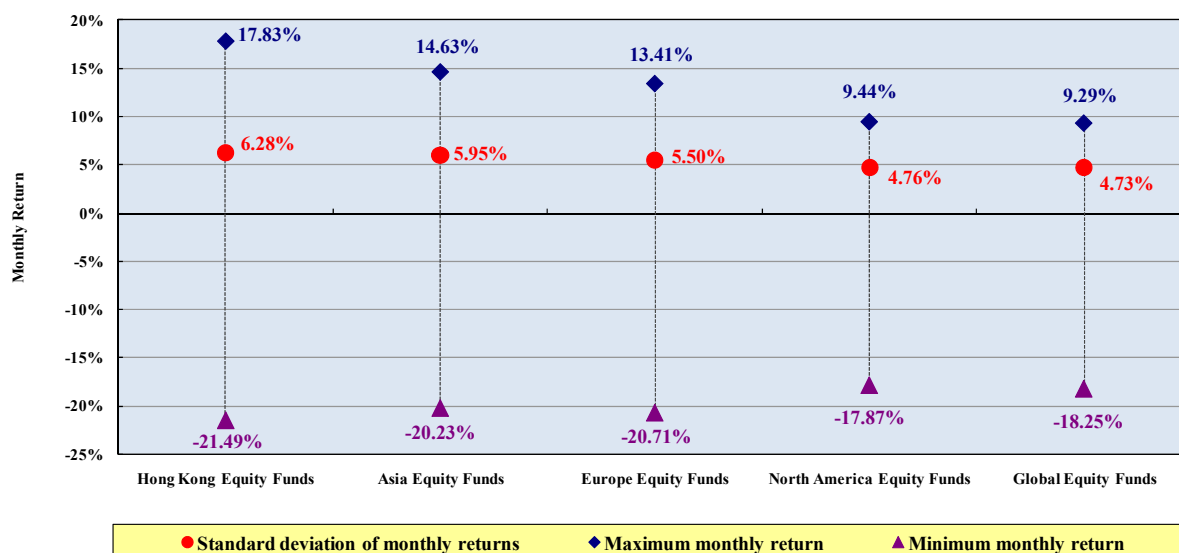
Chart 11 Standard Deviation, Maximum and Minimum Monthly Returns of Mixed Assets Funds by Percentage of Equity Content



Source: MPFA

- Generally speaking, equity funds with heavy regional equity content tended to have higher risk (6.28%, 5.95%, 5.50% and 4.76% standard deviation for Hong Kong, Asia, Europe and North America equity funds respectively) than equity funds with a global equity content (4.73% standard deviation) (Chart 12).

Chart 12 Standard Deviation, Maximum and Minimum Monthly Returns of Equity Funds by Region



Source: MPFA

CHAPTER 5 IMPLICATIONS

Positive Overall Returns Generated for MPF Members

1. The review suggests that the MPF System has added value to contributions since its launch. Over the 10 years reviewed, the MPF System has accumulated retirement savings of HK\$365.44 billion for members. The System was able to boost the accrued benefits of its members by an annualized return of 5.5%, despite the ups and downs of the global economy and financial markets.
2. It should however be noted that the return figures are System-wide figures. Individual members' MPF accounts will have displayed returns in excess of, or lower than, the MPF System as a whole, depending primarily on their choice of fund and the timing of their contributions.

Strong Relationship between Risk and Return

3. The findings of the review are in line with a fundamental concept about investment: the higher the expected return, the higher the associated risk. MPF funds have generally exhibited this expected relationship between risk and return. Those who want better prospects of higher returns over the long term should not expect to be able to do so without facing higher risks in the form of greater volatility of returns over time.
4. Equity funds and mixed assets funds produced higher returns than other fund types but were also shown to be much riskier than other fund types when measured on the basis of standard deviation or range of returns. By contrast, those MPF funds that have exhibited lower levels of volatility (such as MPF conservative funds and money market funds & others) have produced lower returns in the 10-year period.

Saving Outcome Hinges on Members' Investment Decision

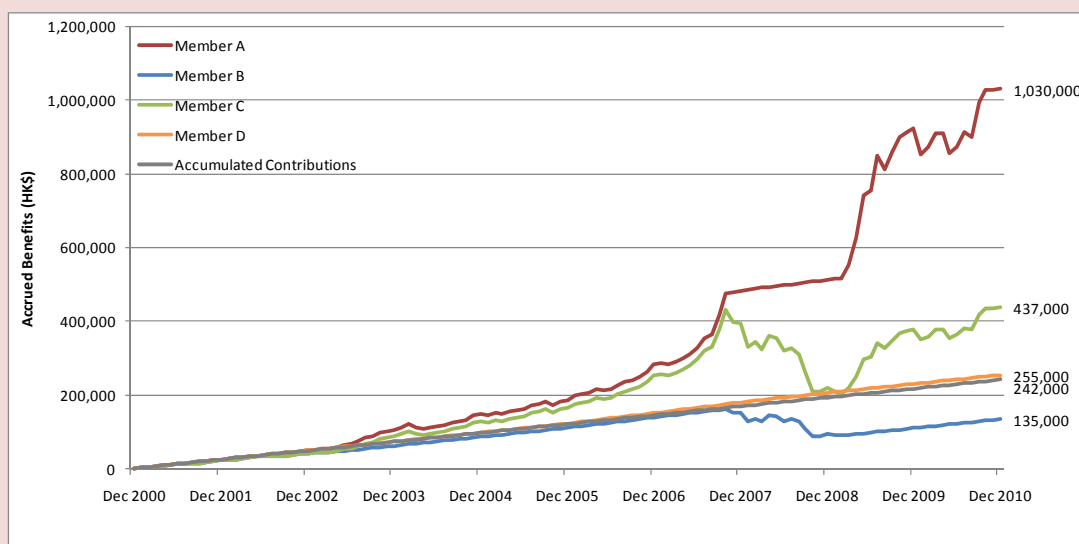
5. Under the MPF System, all members have some choice of investment fund. The fund choice made by members will have an important impact on their saving outcomes, and accordingly, the overall return of the MPF System. As illustrated at length in this report, different types of funds have generated very different levels of returns at different times. In choosing MPF funds within schemes, members should choose those appropriate for their risk tolerance level and personal circumstances. In considering their risk tolerance level, members need to balance the potential discomfort of volatility against the prospect

of longer-term gain. On the one hand, volatility of outcomes can be quite significant – as high as a one-month loss of 20.6% to a one-month gain of 15.4% for equity funds as a group (and even higher for individual funds). On the other hand, investment in lower-risk MPF funds can lead to significant underperformance against other fund types over the longer term. For instance, the cumulative return of equity funds amounted to 75.4% over the 10-year period, while that of MPF conservative funds was only 12.6%. Expressed in another way, equity funds returned, on average, almost six times as much as MPF conservative funds over the review period.

Illustrative Examples: Investment Decisions and Saving Outcomes

The following hypothetical examples illustrate how the investment outcome for MPF savings is highly dependent on the decisions made by a member about the choice of investment funds. Please note that these examples are for illustrative purposes only and, particularly in the case of hypothetical Member A and Member B, do not purport to reflect returns actually achieved. All values indicated in the examples are provided for illustration only. The examples of Member A and Member B are extreme examples posed only to illustrate the outlying possibilities that are theoretically possible on the data. They are not intended to suggest that members should try to pick market turning points, as doing so accurately is not practically possible.

Chart 13 Illustrative Examples of Saving Outcomes



Assumptions:

Commencement of Monthly Contribution: December 2000

Monthly Contribution Amount: HK\$1,000 from member and HK\$1,000 from employer

Rate of Return: Average rate of return of the particular fund/sub-fund types during the period

Note: These are hypothetical examples for illustration purposes. All values indicated in the above chart are for illustrative example only.

- **Member A – the lucky market timer:** This hypothetical member invested his MPF contributions in a capital preservation fund (currently known as MPF conservative fund) 10 years ago. In early 2003, when Hong Kong was affected by SARS, he switched to a Hong Kong equity fund. In late 2007, he switched his MPF investment to an MPF conservative fund. In early 2009 as the investment markets bottomed after the global financial crisis in late 2008, he again switched his MPF investment to a Hong Kong equity fund. After 10 years, his MPF accrued benefits would have been about HK\$1,030,000, more than four times of his aggregate contributions.
- **Member B – the unlucky market timer:** This hypothetical member made the opposite market timing decisions to Member A. He invested his MPF contributions in a Hong Kong equity fund 10 years ago. He switched to an MPF conservative fund in early 2003. In late 2007, he switched his fund choice back to a Hong Kong equity fund. In early 2009, he again switched his fund choice to an MPF conservative fund. After 10 years, the accrued benefits in his MPF account would have been only around HK\$135,000, less than his total contributions by more than HK\$107,000.
- **Member C – the long-term equity fund investor:** This hypothetical member chose a Hong Kong equity fund for investment of his MPF contributions 10 years ago and did not change investment decision at any point. After 10 years, the accrued benefits in his MPF account would be about HK\$437,000, exceeding his total contributions by more than HK\$195,000.
- **Member D – the long-term conservative fund investor:** This hypothetical member chose an MPF conservative fund for investment of his MPF contributions 10 years ago and did not make any change in fund choice during this period. After 10 years, the accrued benefits in his MPF account would be about HK\$255,000, slightly more than his total contributions.

6. With a longer investment horizon, younger members are in a better position to invest a greater portion of their MPF investments in mixed assets funds and equity funds to capture the potentially higher long-term returns if they are prepared to accept the resultant volatility. By contrast, older members who have limited time to retirement might reduce equity exposure because short- or medium-term periods of negative returns could substantially affect the accrued benefits they intend to access in the short- or medium-term.

Diversification Tends to Lower Risk

7. Risk may be reduced by means of a diversified portfolio. In this regard, MPF funds are required under the MPF legislation to diversify their investment across issuers. To further diversify risks, the most critical element is that the correlation between the assets invested in must be low. The review suggests that diversification across regions or asset classes tends to lower investment risk. For instance, the standard deviation of monthly returns of

Global equity funds is lower than those of regional equity funds and the standard deviation of mixed asset funds is lower than equity funds as a whole. As such, members who have only one regional or country equity fund in their portfolios may wish to consider diversifying their portfolio geographically by adding other MPF funds investing in other regions to balance the overall risk exposure where it is possible to do so. Likewise, members who invest entirely in equity funds may consider diversifying the investment risk by adding other MPF funds of lower volatility, such as bond funds, into their MPF investment portfolio.

MPF Returns Should be Considered over the Long Term

8. The results of the review suggest that members should take a long-term view when looking at their MPF investments and, depending on the timing of their need to access accrued benefits, they should not be overly concerned with short-term return fluctuations. Despite the repercussions of the global financial crisis in late 2008 and early 2009, the MPF System was able to weather the storm and generate returns to members' contributions over the 10-year period.
9. The return of MPF investment is characterized by the compounding effect in which reinvesting earnings (e.g. dividends, interest and/or capital gains) over time can lead to potentially larger increases in value. Members can therefore expect that the power of the compounding effect will be more pronounced as the investment horizon gets longer.

Regular Review of MPF Investment

10. Although MPF contribution is a long-term investment, it does not mean that regular monitoring is not necessary. Since MPF accrued benefits are part of members' retirement resources, it is of paramount importance for members to keep track of their personal circumstances and adjust strategies in line with these developments if necessary. Personal circumstances would include members' risk tolerance level, years to retirement and other savings and investments for retirement.

Looking at Past Performance with Care

11. Members are reminded that the return figures set out in this report are only intended to give a generalized indication of the progress of the MPF System and the relationship between risk and return. The return and risk profile of an MPF fund can change over time in accordance with changing economic and market conditions. The fund-type figures set out in the report should not be seen as providing any firm indicator for predicting future

absolute performance of MPF funds. They may however be indicative of reasonable expectations about the relative risk and return attributes of different fund types.

12. Members should not make fund choice decisions solely based on short or even medium-term historical performance. Other relevant factors such as fees and charges, quality of services, and suitability of the individual MPF funds for their own circumstances need to be considered. Members may wish to make use of the Fee Comparative Platform on the MPFA's website to compare the Fund Expense Ratio, On-going Cost Illustration and Fund Risk Indicator and select MPF funds that are suitable to themselves in terms of fees and risk level. Moreover, when making comparison, members should compare the funds under the same fund type.

Features and Categorization of Different Types of MPF Funds

General Features of Different Types of MPF Funds

Fund Type	Investment Objective	Investment Instrument	Risk Level	Major Risk	Points to Note
Equity Fund	To achieve capital appreciation and a return higher than inflation over the long term	Stocks	Relatively high	Volatility of stock markets, fluctuations in exchange rates and the overall condition of listed companies	<ul style="list-style-type: none"> • There are usually three types of equity funds, i.e. funds investing in a single market, regional markets or global markets • They mainly invest in stocks listed on stock exchanges approved by the MPFA
Mixed Assets Fund	To achieve capital appreciation over the long term through investing in a combination of stocks and bonds with risk profile depending on the proportion of stocks and bonds invested by the fund	Stocks and bonds	Medium to high	Volatility of stock markets, fluctuations in interest rates, exchange rates, and credit ratings of bonds, credit risk	<ul style="list-style-type: none"> • Different mixed assets funds have different proportions of stocks and bonds. In general, a higher proportion of stocks is associated with a higher risk
Bond Fund	To earn stable income from interest and coupon rate and make profits from bond trading	Bonds	Low to medium	Fluctuations in interest rates, exchange rates and credit ratings of bonds, credit risk	<ul style="list-style-type: none"> • The bonds must meet the minimum credit rating or listing requirements prescribed by the MPFA

Fund Type	Investment Objective	Investment Instrument	Risk Level	Major Risk	Points to Note
Guaranteed Fund	To provide a guarantee on the capital invested, or to achieve a guaranteed rate of return	Bonds, stocks or short-term interest-bearing money market instruments	Relatively low (but also depends on the qualifying conditions)	Guaranteed rate of return may be modified or even cancelled with prior notice If the assets of the guaranteed fund are invested in an insurance policy, the fund may be exposed to the credit risk of the insurance policy issuer	<ul style="list-style-type: none"> • There are two major types of guarantees, i.e., capital guarantee and return guarantee • To enjoy the guarantee, all qualifying conditions such as minimum investment period and withdrawal requirements must be met
MPF Conservative Fund	To earn a rate of return similar to the Hong Kong dollar savings rate	Short-term bank deposits and bonds	Relatively low	Fluctuations in interest rates	<ul style="list-style-type: none"> • The law requires that each MPF scheme should offer an MPF conservative fund • An MPF conservative fund is a low-risk fund, but its return may not beat inflation or may not even have a positive return • An MPF conservative fund may be described as a money market fund in the Fund Fact Sheet of some MPF schemes
Money Market Fund*	To earn a return higher than savings deposit rate	Short-term bank deposits and bonds	Relatively low	Fluctuations in interest rates	<ul style="list-style-type: none"> • A money market fund is a low-risk fund, but its return may not beat inflation or may not even have a positive return

* In the review, the category of “money market fund & others” covers money market funds that are not MPF conservative funds and uncategorized funds as per the Performance Presentation Standards for MPF Investment Funds.

Categorization of MPF Funds

1. The categorization of MPF funds was mainly based on the fund type as specified under the Fund Descriptor in the latest Fund Fact Sheet of the relevant scheme.
2. For further analysis:
 - (a) Equity funds were classified into five sub-types, namely, Asia, Europe, Global, Hong Kong and North America equity funds.
 - (b) Mixed assets funds were classified into four sub-types, namely, $\leq 40\%$ equity, $>40-60\%$ equity, $>60-80\%$ equity and $>80\%$ equity.
 - (c) Bond funds were classified into two sub-types, namely, Hong Kong and Global bond funds.

Methodology – Calculation of Return

Return of MPF System

1. The return of the MPF System is calculated by way of the **internal rate of return** (“IRR”), a method commonly known as dollar-weighted return. The IRR method, which takes into account the amount and timing of contributions into and benefit withdrawals from the MPF System, is used for the calculation of the return of the MPF System as it could better reflect the feature of cash inflow and outflow of the MPF System.
2. The monthly internal rate of return of the MPF System (“MIRR”) is the discount rate that equates the net present value of all the net monthly contributions made to the MPF System within the review period to the net present value of the accrued benefits at the end of the period.

$$NAV_B + \sum_{i=0}^{n-1} \frac{CF_i}{(1 + MIRR)^i} = \frac{NAV_E}{(1 + MIRR)^n}$$

- Where
- NAV_B : Net asset values of the MPF System at the beginning of the period
 - n : Total number of months
 - CF_i : Net monthly contributions made to the MPF System, i.e. sum of contributions received and benefits transferred from other schemes minus sum of benefits paid out from the MPF System in month i
 - $MIRR$: Monthly Internal Rate of Return of the period
 - NAV_E : Net asset values of the MPF System at the end of the period

3. Assumption: All the net monthly contributions made to the MPF System occurred at the beginning of the month.
4. The annualized dollar-weighted return for the MPF System is calculated by raising the MIRR to the power of 12:

$$\text{Annualized Internal Rate of Return} = (1 + MIRR)^{12} - 1$$

Return of Different Types of MPF Funds

5. The returns of different types of MPF funds are calculated by way of the time-weighted method. The time-weighted method takes into account the unit price and asset size of each MPF fund at different points in time. Unlike the IRR method, it does not capture the impact of the contributions into and benefit withdrawals from MPF funds.
6. The **investment return** (“IR”) of an MPF fund for month t is calculated by dividing the difference between the unit price of the MPF fund at the end of month t and the unit price of the MPF fund at the end of the previous month $t-1$ by the unit price of the MPF fund at the end of the previous month $t-1$.

$$IR_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

where

- IR_t : Return of the MPF fund for month t
 P_{t-1} : Unit price of the MPF fund at the end of month $t-1$
 P_t : Unit price of the MPF fund at the end of month t

7. The **NAV-weighted monthly return** of MPF funds by type is calculated by dividing the sum of the product of the return of each MPF fund and its net asset value of the same type for a specific month by the net asset value of all of the MPF funds of the same type of the same period.

$$IR(\text{type } A)_t = \frac{\sum_{i=1}^{n(\text{type } A)} NAV_{(t,i)} \times IR_{(t,i)}}{\sum_{i=1}^{n(\text{type } A)} NAV_{(t,i)}}$$

where

- $n(\text{type } A)$: Number of MPF funds grouped under $\text{type } A$
 $NAV_{(t,i)}$: Net asset value of the i^{th} MPF fund grouped under $\text{type } A$ at the beginning of month t
 $IR_{(t,i)}$: Return of the i^{th} MPF fund grouped under $\text{type } A$ of month t

8. The **cumulative return** (“CIR”) of MPF funds by type for any period (totally N months) is calculated by the geometric link of the NAV-weighted monthly returns of the MPF funds within the same type for the period.

$$CIR(\text{type } A) = \prod_{t=1}^N (1 + IR(\text{type } A)_t) - 1$$

where

$IR(\text{type } A)$: NAV-weighted monthly return of the MPF funds grouped under $\text{type } A$

N : Total number of months

9. The **annualized return** (“AIR”) of MPF funds by type for any period is calculated by adjusting, on an annualized basis, the cumulative return of MPF funds within that specific type for the period.

$$AIR(\text{type } A) = \sqrt[12/N]{1 + CIR(\text{type } A)} - 1$$

where

$AIR(\text{type } A)$: Annualized return of the MPF funds grouped under $\text{type } A$ for the period

$CIR(\text{type } A)$: Cumulative return of the MPF funds grouped under $\text{type } A$ for the period

N : Total number of months

Adjustments

10. Due to data limitations, the following adjustments were made in deriving the returns of certain MPF conservative funds and guaranteed funds:

(a) [MPF Conservative Funds](#)

During the review period, several MPF conservative funds charged fees via deduction of units. The return figures for these MPF conservative funds had been adjusted to eliminate, as far as possible, any errors caused by charging fees via deduction of units.

(b) [Guaranteed Funds](#)

For those guaranteed funds without a unit price, the declared rates of return were used as the returns for the funds.

Methodology – Risk Measurement

Standard Deviation of Monthly Returns

1. **Standard deviation** is used as the measurement of risk. Standard deviation measures how closely a set of values is clustered around the average of those values. If a set of values is close to the average of those values, the standard deviation is said to be low (a figure closer to zero). On the other hand, if a set of values is spread across a greater range, the standard deviation is said to be high (a figure further away from zero).

$$SD(\text{type } A) = \sqrt{\frac{\sum_{i=1}^N (IR(\text{type } A)_i - \overline{IR(\text{type } A)})^2}{N}}$$

where

$SD(\text{type } A)$: Standard deviation of monthly returns of the MPF funds grouped under *type A* for the period

$IR(\text{type } A)_i$: NAV-weighted monthly return of the MPF funds grouped under *type A* of month *i*

$\overline{IR(\text{type } A)}$: Simple average of the NAV-weighted monthly returns of the MPF funds grouped under *type A* over the period

N : Total number of months

Range of Monthly Returns

2. The **range** of monthly returns of the MPF funds by type for the period is calculated by taking the difference between the highest monthly return and the lowest monthly return over the period.

$$\text{Range}[IR(\text{type } A)] = \text{Max}[IR(\text{type } A)] - \text{Min}[IR(\text{type } A)]$$

where

$\text{Range}[IR(\text{type } A)]$: Range of the MPF funds grouped under *type A* for the period

$\text{Max}[IR(\text{type } A)]$: Highest monthly return of the MPF funds grouped under *type A* for the period

$\text{Min}[IR(\text{type } A)]$: Lowest monthly return of the MPF funds grouped under *type A* for the period